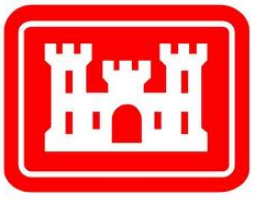
# Berryessa Creek Element
# Coyote and Berryessa Creeks
# Flood Control Project
# Santa Clara County, California

## Appendix A: Environmental

## Part III

## Habitat Assessment and Surveys for the California Red-Legged Frog



# HABITAT ASSESSMENT AND SURVEYS FOR THE CALIFORNIA RED-LEGGED FROG (*Rana draytonii*) AND FOOTHILL YELLOW-LEGGED FROG (*Rana boylii*) ON THE UPPER BERRYESSA CREEK DRAINAGE, SAN JOSE, CALIFORNIA

Prepared by:

Mark R. Jennings
**Rana Resources**
P.O. Box 2185
Davis, CA 95617-2185

For

Steve Bui
Santa Clara Valley Water District
Coyote Watershed Program
2290 North First Street, Suite 212
San Jose, CA 95131

September 18, 2006

## TABLE OF CONTENTS

Executive Summary……..…..02

Introduction…….…...03

Study Area……...…….…. 03

Materials and Methods……..…….05

California Red-Legged Frog Overview……...…….…. 06

Foothill Yellow-Legged Frog Overview……...……..…….…. 09

Results and Discussion……...……... 11

Acknowledgments…….…….14

Literature Cited…….……. 14

Appendices…….……19

## EXECUTIVE SUMMARY

Habitat assessments and ocular surveys were conducted for California red-legged frogs (CRLF; *Rana draytonii*) and foothill yellow-legged frogs (FYLF; *Rana boylii*) on 16, 24, and 31 March, 10 and 30 April, 17 May, and 20 and 27 July 2006, on the upper Berryessa Creek drainage in San Jose, Santa Clara County, California, to determine if these species were potentially present within and upstream of the proposed U.S. Army Corps of Engineers and Santa Clara Valley Water District Berryessa Creek Project site. The surveys for CRLFs were conducted using the most recent U.S. Fish and Wildlife Service survey protocol. The entire length of Berryessa Creek was surveyed from Morrill Avenue, upstream to a major fork in the drainage at 750 feet (approximately 0.5 miles east of the San Jose City Boundary). Although there are no known records for CRLFs or FYLFs within the drainage, and no frogs of either species were observed on the creek itself, a breeding population of CRLFs was found in 3 of 5, spring-fed, ponds located in the middle part of the drainage near the eastern San Jose City Boundary, about 1.25 miles upstream of the proposed project area. The ponds are located below a major spring on a hillside approximately 160 feet above the creek and 800 feet south of the creek. Because of the pond's distance from the creek, the lack of deep (>2-feet) pools in the creek, the intermittent nature of the creek (it flows less than 7 months out of the year during normal rainfall years), and the presence of predators such as raccoons (*Procyon lotor*), Berryessa Creek proper is unsuitable for CRLFs and FYLFs and they do not presently inhabit this stream. Instead, Pacific treefrogs (*Hyla regilla*) and California toads (*Bufo boreas halophilus*), which are much more suited to intermittent and shallow aquatic habitats, are present in Berryessa Creek throughout the mainstream where they successfully breed at a number of locations within the drainage. Since CRLFs and FYLFs do not inhabit the main channel of Berryessa Creek, CRLFs are unable to colonize the stream course, and the project site is 1.25 miles away from the nearest known CRLF population, the proposed project in upper Berryessa Creek will not have any adverse effects on these two species.

## INTRODUCTION

The Berryessa Creek Project is located in Santa Clara County, California, within the City of San Jose along a section of Berryessa Creek that runs from Morrill Avenue upstream to just above Old Piedmont Road (Figure 1). The U.S. Army Corps of Engineers and their local partner, the Santa Clara Valley Water District, propose to rechannelize portions of the stream and enhance the riparian corridor in order to provide enhanced flood protection for the Cities of San Jose and Milpitas. The project will also greatly enhance urban wildlife habitats (both aquatic and terrestrial) in Berryessa Creek Park and the greenbelt area. Because the area lies within the native range of the California red-legged frog (CRLF; *Rana draytonii*) and the foothill yellow-legged frog (FYLF; *Rana boylii*) [see Jennings et al. 1997, 1999], and there are known records for these two species within 5 miles of the project site (California Department of Fish and Game 2005), the following ocular surveys and habitat assessments were conducted to determine if there was any actual or potential breeding, feeding, movement corridors, and estivation/hibernation habitats for CRLF and FYLF. Per recent taxonomic changes with frog species in California, I follow Jennings (2004) and Shaffer et al. (2004) and use the scientific name "*Rana draytonii*" for the CRLF. In almost all other documents and field guides, this frog is stated as the subspecies "*Rana aurora draytonii*" (e.g., see Stebbins 2003).

## STUDY AREA

The portion of upper Berryessa Creek that was surveyed for frogs was from Morrill Avenue upstream to a major fork in the drainage at 750 feet elevation (approximately 0.5 miles east of the easternmost San Jose City Boundary) [Figure 1]. This includes portions of the stream that flows through the greenbelt and Berryessa Creek Park and the other urbanized areas of the extreme northeastern part of San Jose. Upstream of Old Piedmont Road, the creek flows through a brush and tree-lined canyon that (except for the bluegum (*Eucalyptus globulus*) forest just above Old Piedmont Road), is largely used for livestock grazing. Although the stream channel contains areas of bedrock and cobble, there is a

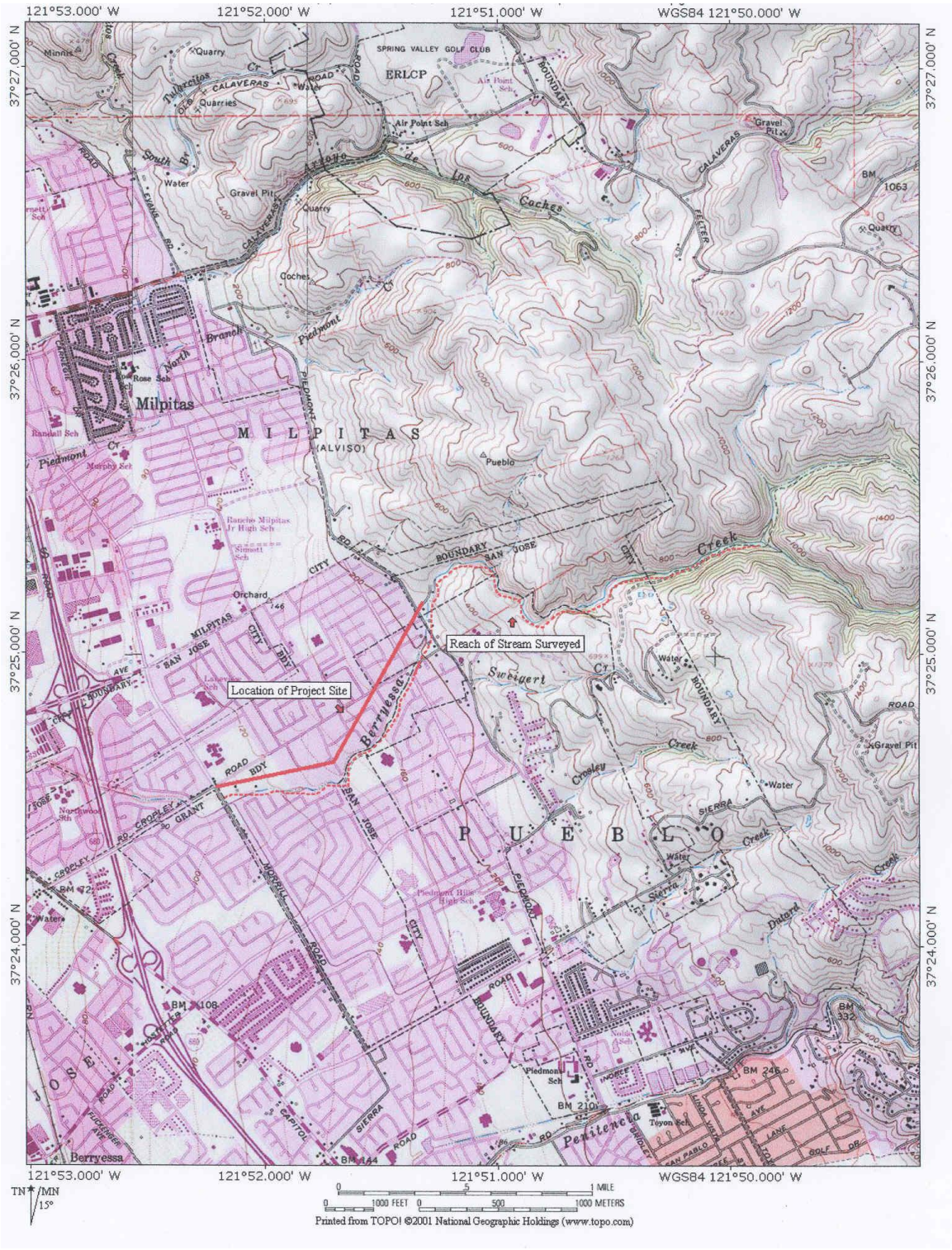



Figure 1. Location of the upper Berryessa Creek watershed in northeastern San Jose, project site location, and the reach of the stream surveyed for frogs.

great deal of fine sediment in the bed load with the result of almost no pools greater than 2 feet deep. Instead, most pools within the main creek channel are less than 1 foot deep. The upper part of the study area is relatively remote, although there are a number of dirt roads that reach houses located on the slopes within the upper Berryessa Creek drainage. Many of the dwellings contain orchards, stock ponds, and ornamental trees that contrast greatly with the native vegetation on the hillsides. Only a single dirt road reaches the bottom of the upper part of Berryessa Creek that I surveyed.

## MATERIALS AND METHODS

The habitat assessment and ocular surveys for the CRLF followed guidelines as set forth by the U.S. Fish and Wildlife Service (U.S. Fish and Wildlife Service 2005). The habitat assessment and ocular surveys for FYLF followed those successfully used by me in other studies (e.g., see Jennings and Hayes 1994 and Jennings et al. 1999). The entire study area was surveyed for both species during daylight hours on 16 March, 17 May, and 27 July 2006, and at night on 24 and 31 March, 10 and 30 April, and 20 July 2006. Surveys were conducted as per protocol survey standards for CRLFs (U.S. Fish and Wildlife Service 2005) and my long-term experience with both species (e.g., see Jennings and Hayes 1994). A flashlight was used to locate the eye shines of frogs during nighttime hours and I repeatedly listened for calling male CRLFs and FYLFs using the identifications provided by Davidson (1995). Additionally, I conducted a habitat assessment for both species following an initial review of historical information previously gathered by me (see Jennings et al. 1997, 1999). All records for CRLFs and FYLFs within a 5-mile radius of the site were obtained and reviewed from the California Natural Diversity Database (California Department of Fish and Game 2005). These records are plotted on aerial photographs and determined if they were within potential movement corridors for CRLFs and FYLFs within the upper Berryessa Creek drainage.

## CALIFORNIA RED-LEGGED FROG OVERVIEW

**Federal listing status: Threatened. State listing status: Species of Special Concern.** On 15 January 1992, the CRLF was petitioned for listing as an endangered species by the U.S. Fish and Wildlife Service (Sorensen 1993) based on a 70% range reduction and continued threats to surviving populations (Miller 1994). The frog was subsequently listed as Threatened by the U.S. Fish and Wildlife Service on 23 May 1996 (Miller et al. 1996), with further recent revisions to critical habitat and management of this species (U.S. Fish and Wildlife Service 2006).

The CRLF is a large brown to reddish-brown frog that attains lengths up to 3.25-5.5 inches from the tip of the snout to the end of its vent. These frogs have prominent dorsolateral folds and diffuse moderate-sized dark brown to black spots that sometimes have light centers (Storer 1925, Jennings and Hayes 1994). The distribution of red or red-orange pigment is highly variable, but usually restricted to the belly and the undersurfaces of the thighs, legs and feet (Jennings and Hayes 1994). Frogs in southern California often have red only on the undersurfaces of the feet (Jennings pers. observ.). There are prominent dorsolateral folds, which are yellow or orange-colored in juveniles (Stebbins 2003). The groin has a distinct black mottling on a white or yellow background. The iris is dark brown with iridophores on the upper and lower portions of the iris (Jennings and Hayes 1994).

Larvae range in length from 0.55-3.15 inches in total length and have up to 2-3 upper and 3-4 lower tooth rows (Stebbins 2003). Newly hatched tadpoles generally are blackish in color, gradually changing to a brown background color with darker marbling or spots after a week or two of growth (Storer 1925).

This amphibian is the largest native frog in the state. There are data to support elevating the subspecies to a full species separate from the northern red-legged frog (*Rana aurora aurora*) [see Hayes and Miyamoto 1984, Hayes and Kremples 1986, Green 1985]. The large zone of intergradation along the Pacific slope of the North Coast Range reported by

Hayes and Kremples (1986) has been greatly contracted to a point in mid-Mendocino County by recent biochemical studies (Shaffer et al. 2004).

**Life History and Ecology**

CRLFs are pond-dwelling amphibians that generally live in the vicinity of permanent aquatic habitats including livestock ponds and pools in perennial streams (Jennings and Hayes 1994). The most optimal habitat is characterized by dense, shrubby riparian vegetation associated with deep (>2.3 feet), still, or slow-moving water (Hayes and Jennings 1988, Jennings 1988). The shrubby riparian vegetation that structurally seems to be most suitable for this frog is that provided by arroyo willow (*Salix lasiolepis*), although cattails (*Typha* spp.) and bulrushes (*Scirpus* spp.) also can provide suitable habitat (Jennings 1988). Although CRLFs are found in ephemeral streams and ponds, populations cannot be maintained where all surface water disappears (Jennings and Hayes 1994). This frog is infrequent or absent in habitats where introduced aquatic predators such as green sunfish (*Lepomis cyanellus*), Louisiana red-swamp crayfish (*Procambarus clarkii*) and bullfrogs (*Rana catesbeiana*) are present (Hayes and Jennings 1986, 1988), probably because the larval stages are susceptible to such predators (Jennings and Hayes 1994).

Reproduction occurs at night in permanent ponds or the slack water pools of streams during the winter and early spring (late November-through April) after the onset of warm rains (Storer 1925, Hayes and Jennings 1988, Jennings and Hayes 1994). Males generally appear at breeding sites from 2-4 weeks before females (Storer 1925). At breeding sites, males typically call in small mobile groups of 3-7 individuals that attract females (Jennings and Hayes 1994). Females amplex with males and attach egg masses containing approximately 2,000-6,000 eggs to an emergent vegetation brace at depths usually from 3-4 inches deep (Storer 1925). Eggs hatch after 6-14 days (depending on the prevailing water temperature), and the resulting larvae require 3.5-7 months to attain metamorphosis (Storer 1925). Some tadpoles may also over winter (Fellers et al. 2001a). Juvenile frogs are about 1 inch (25.4 millimeters) long at metamorphosis and commonly

sun themselves during the day at the edge of the riparian zone next to the breeding site. As they grow, they gradually shift from diurnal and nocturnal periods of activity, to largely nocturnal activity (Hayes and Tennant 1986). During periods of rainfall, both juveniles and a few adults may disperse away from breeding sites and may be found some distance (up to 0.5 mile) away from the nearest water (Jennings, unpubl. data). Frogs found in the coastal drainages appear to be rarely inactive, whereas those found in interior sites probably hibernate (Storer 1925). Frogs generally reach sexual maturity in their second year for males and third year for females (Jennings and Hayes 1985). During extended periods of drought, frogs may take 3-4 years to reach sexual maturity (Jennings and Hayes 1994). Based on limited field data, CRLFs appear to live about 8-10 years in the wild (Jennings, unpubl. data).

CRLFs have declined largely due to habitat loss and the introduction of non-native aquatic predators such as green sunfish, red-swamp crayfish and bullfrogs (Jennings and Hayes 1994). It is possible that a pathogen also helped to eliminate frog populations in southern California during the 1970s (Fellers et al. 2001b). Recent work suggests that nitrate/nitrite pollution (Marco et al. 1999) and pesticide drift (Davidson et al. 2001, 2002) also may be responsible for frog declines in California.

CRLFs were historically found west of the Sierra Nevada crest from mid-Mendocino County and the vicinity of Redding, south into northwestern Baja California (Jennings 1995). There are documented records of CRLFs in the adjoining drainages of upper Penitencia Creek to the south (Jennings et al. 1997) and in adjoining drainages to the north (near Ed Levin County Park) in the California Natural Diversity Data Base (California Department of Fish and Game 2005). Although CRLFs are still present within suitable habitats in the hills to the east of San Jose, they have been largely eliminated by channelization of aquatic habitats and by raccoons, bullfrogs, and other introduced aquatic predators in the urbanized areas of the city.

## FOOTHILL YELLOW-LEGGED FROG OVERVIEW

**Federal listing status: None. State listing status: Species of Special Concern.**
Although The Center For Biodiversity is currently putting together a petition to send to the U.S. Fish and Wildlife Service, this frog is presently listed as a "Species of Special Concern" by the California Department of Fish and Game (Jennings 2004). It has apparently disappeared from about 45% of its historic range in California due to habitat loss, the widespread introduction of aquatic predators such as fishes and bullfrogs, diseases (possibly introduced), and agricultural chemicals (Jennings and Hayes 1994; Jennings 1995; Davidson et al. 2002).

The FYLF is a moderate-sized, highly variably colored, frog that attains lengths up to ranges 1.5-3.25 inches from the tip of the snout to the end of its vent. The back is usually dark to light gray, brown, green, or yellow with a somewhat mottled appearance often with considerable amounts of brick or reddish pigment, and rough tubercled skin (Zweifel 1955; Jennings and Hayes 2005). A light band between the eyelids is normally present, often appearing as a pale triangle between the eyelids and the nose (Stebbins 2003). The distribution of yellow or yellow-orange pigment is variable, but usually restricted to the belly and the undersurfaces of the thighs, legs, and feet (Jennings and Hayes 1994).

### Life History and Ecology

FYLFs are a stream-dwelling form that requires shallow, flowing water, apparently preferentially in small to moderate-sized stream situations with at least some cobble-sized substrate (Hayes and Jennings 1988, Jennings 1988). This type of habitat is probably best suited to oviposition (see Storer 1925, Fitch 1936, Zweifel 1955) and likely provides significant refuge habitat for larvae and postmetamorphs (Hayes and Jennings 1988, Jennings 1988). Streams utilized by frogs can be perennial or intermittent (Hayes and Jennings 1988, Kupferberg 1996a), but for the latter type, a permanent watercourse must be either immediately up- or down-stream, or in the nearby general area (Jennings, unpubl. data).

Adult FYLFs have been observed to breed from late March into early June (Storer 1925, Grinnell et al. 1930, Wright and Wright 1949). Breeding normally occurs following the period of high flows that result from rainwater and snowmelt, although other hydrologic factors such as water temperatures above 44.6°F may influence the timing of breeding and oviposition (Kupferberg 1996a, Van Wagner 1996). Male frogs attracting females typically call in small groups of 2-5 from within the cracks of underwater rocks and boulders (MacTague and Northen 1993), although there are observations of males calling above the water surface (MacTague and Northen 1993; Van Wagner 1996; Jennings, unpubl. data). At least part of the courtship activity occurs at night (Van Wagner 1996). Following amplexus, the females move to an oviposition site where at night they deposit an egg mass of 300-1200 eggs on the downstream side of cobbles and boulder over which a relatively gentle flow of water exists (Storer 1925, Fitch 1936, Zweifel 1955). Most egg masses are laid within about 1-foot of the surface of the water (Van Wagner 1996).

Eggs hatch within 5-31 days depending on water temperatures (Zweifel 1955, Kupferberg 1996b). Most larvae metamorphose into juvenile frogs after 3-4 months of development (Storer 1925, Zweifel 1955, Kupferberg 1996b), although there are observations of larvae metamorphosing in stream environments as late as October (Jennings 1988). Sexual maturity is probably reached in 2 years (Storer 1925, Van Wagner 1996); however, frogs of both sexes may reach sexual maturity in 1 year if food resources are sufficient (Jennings 1988). Based on limited field data, FYLFs appear to live about 3-4 years in the wild (Kupferberg 1996b, Van Wagner 1996).

FYLFs appear to move in and out of riparian zones during various parts of the year, as both juvenile and adult frogs have been found as far as 164 feet from the nearest watercourse (Nussbaum et al. 1983). While some of this movement may be due to flooding or other hydrologic events known to scour frogs downstream (Kupferberg 1996a, Lind et al. 1996, Van Wagner 1996), frogs may also be actively foraging away from riparian zones--based on the wide variety of terrestrial invertebrates found in some frog stomachs (Van Wagner 1996).

There is no approved protocol for surveying eggs, larvae, juveniles, adults, or calling males. Juvenile and adult frogs are easily observed during the spring and summer months (March-July) during daylight hours along stream courses (Zweifel 1955). Egg masses can be observed during about a 2-3 week window when frogs are actively breeding (Jennings, pers. observ.). Larvae can be dipnetted with practice during the summer months (Jennings, pers. observ.).

This frog was historically known to occur in most Pacific drainages from the Santiam River system in Mehama, Marion County, Oregon, south to the San Gabriel River system, Los Angeles County, California (Storer 1923, 1925; Fitch 1938; Marr 1943, Zweifel 1955), at elevations between near sea level to 6,700 feet (Jennings and Hayes 1994). There was an isolated outpost reported from the Sierra San Pedro Martir, Baja California, Mexico (Loomis 1965), which is apparently now extinct. This frog is predicted to occur within the survey area. The closest documented location is near what was then known as the town of Berryessa, somewhere along the middle reaches of Penitencia Creek (Jennings et al. 1999). However, this museum specimen was collected in 1904 and that population is now extinct due to extensive urbanization of the area. The next nearest location is in upper Penitencia Creek near the headquarters of Alum Rock Park. The population was presumed to be extant during the 1990s (Jennings et al. 1999).

## RESULTS AND DISCUSSION

Results of the ocular surveys showed no CRLFs or FYLFs in the Berryessa Creek stream channel (see data sheets in Appendix 1). As predicted by earlier surveys conducted by the Santa Clara Valley Water District (M. Moore, pers. comm.), I found Pacific treefrogs (*Hyla regilla*) and California toads (*Bufo boreas halophilus*) to be common in several sections of the stream channel, especially in urbanized areas where residents water their lawns on a regular basis (which results in runoff into the nearby stream channel that daily rehydrates the pools of water used by these amphibians). The stream channel itself was poor habitat for CRLFs and FYLFs due to its intermittent nature (the stream supports no

fish species because it dries on a yearly basis), lack of deep (>2 feet) pools of water, and the presence of many raccoons throughout the area surveyed (see data sheet in Appendix 2).

Instead, a breeding population of CRLFs was discovered in 3 of 5 grouped ponds located in the middle part of the drainage near the easternmost San Jose City Boundary, about 1.25 miles upstream of the proposed project area boundary (Figure 2) [Appendix 3]. The ponds are located below a major spring on a hillside approximately 160 feet above the creek and 800 feet south of the creek proper. The ponds with CRLFs contain water year around, are deep (>4 feet), and have abundant riparian cover and food resources. Because of the distance from the Berryessa Creek proper and the intermittent nature of the creek itself (it apparently flows less than 7 months out of the year during normal rainfall years), no juvenile CRLFs are able to colonize the main creek channel. If they did, they would soon be swept away during flood flows or predated by raccoons, as there are no deep pools for frogs to escape in. Indeed, no CRLFs or FYLFs have been observed in Berryessa Creek below Old Piedmont Road despite the multiple amphibian surveys conducted since the year 2000 (M. Moore, Santa Clara Valley Water District, pers. comm.). Since CRLFs and FYLFs do not inhabit the main channel of Berryessa Creek and CRLFs are unable to colonize the stream course, the proposed project in upper Berryessa Creek will not have any adverse effects on these two species. The project site is located approximately 1.25 miles downstream from the region where CRLFs were observed in ponds on the hillside. Additionally, the project site is located in a densely urbanized area with many roads, fences, and foraging raccoons between the project site and the ponds with CRLFs. Given these observations, it is my professional opinion that the project, as proposed by the U.S. Army Corps of Engineers and the Santa Clara Valley Water District, will have no influence on potential CRLF movements or dispersals, and therefore have no apparent, negative effects on this species.

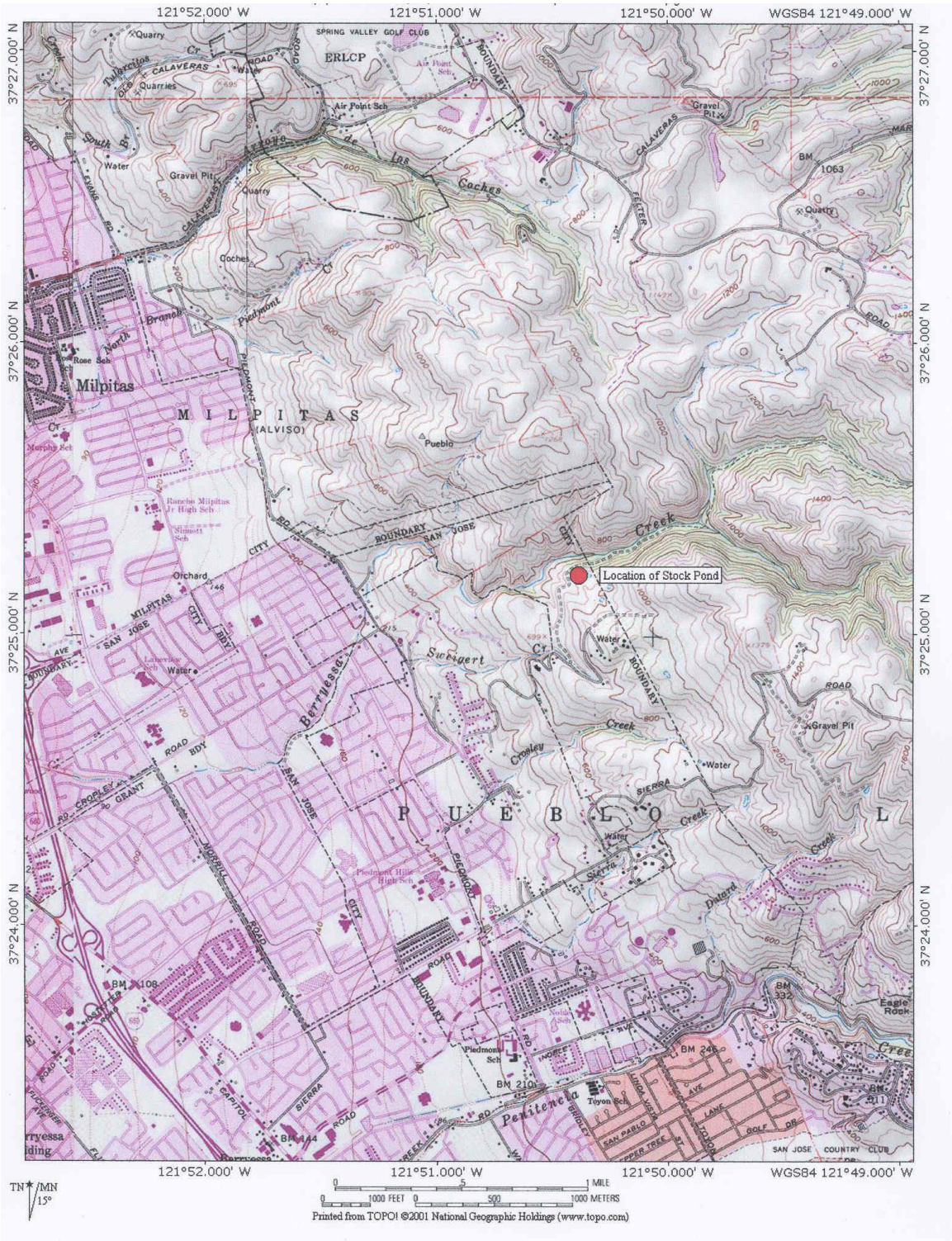



Figure 2. Location of the stock pond where California red-legged frogs were observed in the upper Berryessa Creek drainage.

## ACKNOWLEDGMENTS

My thanks to Melissa Moore of the Santa Clara Valley Water District for assisting with some of the daylight ocular frog surveys and for previous survey information regarding amphibians in upper Berryessa Creek.

## LITERATURE CITED

California Department of Fish and Game. 2005. California Natural Diversity Database. RareFind 3.05. Santa Clara County.

Davidson, C. 1995. Frog and toad calls of the Pacific Coast. Library of Natural Sounds, Cornell Laboratory of Ornithology, Ithaca, New York. 27 pages + 1 cassette.

Davidson, C., H. B. Shaffer, and M. R. Jennings. 2001. Declines of the California red-legged frog: spatial analysis of the climate change, UV-B, and pesticide hypotheses. Ecological Applications, 11(2):464-479.

Davidson, C., H. B. Shaffer, and M. R. Jennings. 2002. Spatial tests of the pesticide drift, habitat destruction, UV-B, and climate change hypotheses for California amphibian declines. Conservation Biology, 16(6):1588-1601.

Fellers, G. M., D. E. Green, and J. E. Longcore. 2001a. Oral chytridiomycosis in mountain yellow-legged frogs (*Rana muscosa*). Copeia 2001:945-953.

Fellers, G. M., A. E. Launer, G. B. Rathbun, S. Bobzien, J. Alvarez, D. Sterner, R. B. Seymour, and M. Westphal. 2001b. Overwintering tadpoles in the California red-legged frog (*Rana aurora draytonii*). Herpetological Review, 32(3):156-157.

Fitch, H. S. 1936. Amphibians and reptiles of the Rogue River Basin, Oregon. American Midland Naturalist, 17(3):634-652.

Fitch, H. S. 1938. *Rana boylii* in Oregon. Copeia, 1938(3):148.

Green, D. M. 1985. Differentiation in heterochromatin amount between subspecies of the red-legged frog, *Rana aurora*. Copeia, 1985(4):1071-1074.

Grinnell, J., J. Dixon, and J. M. Linsdale. 1930. Vertebrate natural history of a section of northern California through the Lassen Park region. University of California Publications in Zoology, 35:1-594.

Hayes, M. P., and M. R. Jennings. 1986. Decline of ranid frog species in western North America: are bullfrogs (*Rana catesbeiana*) responsible? Journal of Herpetology, 20(4):490-509.

Hayes, M. P., and M. R. Jennings. 1988. Habitat correlates of distribution of the California red-legged frog (*Rana aurora draytonii*) and the foothill yellow-legged frog (*Rana boylii*): implications for management. Pages 144-158 In: R. C. Szaro, K. E. Severson, and D. R. Patton (technical coordinators). Management of Amphibians, Reptiles, and Small Mammals in North America. Proceedings of the Symposium, July 19-21, 1988, Flagstaff, Arizona. U.S. Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado. General Technical Report (RM-166):1-458.

Hayes, M. P., and D. M. Kremples. 1986. Vocal sac variation among frogs of the genus *Rana* from western North America. Copeia, 1986(4):927-936.

Hayes, M. P., and M. M. Miyamoto. 1984. Biochemical, behavioral and body size differences between the red-legged frogs, *Rana aurora aurora* and *Rana aurora draytoni*. Copeia, 1984(4):1018-1022.

Hayes, M. P., and M. R. Tennant. 1986. Diet and feeding behavior of the California red-legged frog, *Rana aurora draytonii* (Ranidae). The Southwestern Naturalist, 30(4):601-605.

Jennings, M. R. 1988. Natural history and decline of native ranids in California. Pages 61-72 In: H. F. De Lisle, P. R. Brown, B. Kaufman, and B. McGurty (editors). Proceedings of the Conference on California Herpetology. Southwestern Herpetologists Society, Special Publication (4):1-143.

Jennings, M. R. 1995. Native ranid frogs in California. Pages 131-134 In: E. T. LaRoe, G. S. Farris, C. E. Puckett, P. D. Doran, and M. J. Mac (editors). Our Living Resources: A Report to the Nation on the Distribution, Abundance, and Health of U.S. Plants, Animals, and Ecosystems. U.S. Department of the Interior, National Biological Service, Washington, D.C. xi+530 p.

Jennings, M. R. 2004. An annotated check list of the amphibians and reptiles of California and adjacent waters (third, revised edition). California Fish and Game, 90(4):161-213.

Jennings, M. R., and M. P. Hayes. 1985. Pre-1900 overharvest of the California red-legged frog (*Rana aurora draytonii*): the inducement for bullfrog (*R. catesbeiana*) introduction. Herpetologica, 41(1):94-103.

Jennings, M. R., and M. P. Hayes. 1994. Amphibian and reptile species of special concern in California. Final report to the California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, California, under contract number 8023. iii+225 p.

Jennings, M. R., and M. P. Hayes. 2005. Natural history notes: *Rana boylii* (foothill yellow-legged frog). Coloration. Herpetological Review, 36(4):438.

Jennings, M. R., S. Townsend, and R. R. Duke. 1997. Santa Clara Valley Water District California red-legged frog distribution and status—1997. Final report prepared for the Santa Clara Valley Water District, San Jose, California. H. T. Harvey and Associates, Alviso, California. [Project No. 1164-01]. 16 p+1 appendix.

Jennings, M. R., R. R. Duke, G. E. Flohr, T. P. Haney, and P. A. Hartman. 1999. Santa Clara Valley Water District foothill yellow-legged frog distribution and status—1999. Final report prepared for the Santa Clara Valley Water District, San Jose, California. H. T. Harvey and Associates, San Jose, California. [Project No. 1563-01]. i+17 p.+1 appendix.

Kupferberg, S. J. 1996a. Hydrologic and geomorphic factors affecting conservation of a river-breeding frog (*Rana boylii*). Ecological Applications, 6(4):1332-1334.

Kupferberg, S. J. 1996b. The ecology of native tadpoles (*Rana boylii* and *Hyla regilla*) and the impact of invading bullfrogs (*Rana catesbeiana*) in a northern California river. Unpublished Ph.D. Dissertation, University of California, Berkeley, California. vi+289 p.

Lind, A. J., H. H. Welsh, and R. A. Wilson. 1996. The effects of a dam on breeding habitat and egg survival of the foothill yellow-legged frog (*Rana boylii*) in northwestern California. Herpetological Review, 27(2):62-27.

Loomis, R. B. 1965. The yellow-legged frog, *Rana boylii*, from the Sierra San Pedro Martir, Baja California Norte, Mexico. Herpetologica, 21(1):78-80.

McCasland, C., and B. Twedt. 2000. Endangered and threatened wildlife and plants; proposed designation of critical habitat for the California red-legged frog (*Rana*

*aurora draytonii*). Federal Register, 65(176):54892-54932. [Monday, September 11, 2000].

MacTeague, L., and P. T. Northen. 1993. Underwater vocalization by the foothill yellow-legged frog (*Rana boylii*). Transactions of the Western Section of the Wildlife Society, 29:1-7.

Marr, J. C. 1943. Range extension for *Rana boylii boylii*. Copeia, 1943(1):56.

Miller, K. J. 1994. Endangered and threatened wildlife and plants; proposed endangered status for the California red-legged frog. Federal Register, 59(22):4888-4895. [Wednesday, February 2, 1994].

Miller, K. J, A. Willy, S. Larsen, and S. Morey. 1996. Endangered and threatened wildlife and plants; determination of threatened status for the California red-legged frog. Federal Register, 61(101):25813-25833. [Thursday, May 23, 1996].

Nussbaum, R. A., E. D. Brodie, Jr., and R. M. Storm. 1983. Amphibians and reptiles of the Pacific Northwest. The University Press of Idaho, Moscow, Idaho. 332 p.

Rathbun, G. B., M. R. Jennings, T. G. Murphey, and N. R. Siepel. 1993. Status and ecology of sensitive aquatic vertebrates in lower San Simeon and Pico Creeks, San Luis Obispo County, California. Final report prepared for the California Department of Parks and Recreation, San Simeon Region, through Cooperative Agreement (14-16-0009-01-1909). U.S. Fish and Wildlife Service, National Ecology Research Center, Piedras Blancas Research Station, San Simeon, California. xi+103 p.

Shaffer, H. B., G. M. Fellers, S. R. Voss, J. C. Olive, and G. B. Pauly. 2004. Species boundaries, phylogeography, and conservation genetics of the red-legged frog (*Rana aurora*/*draytonii*) complex. Molecular Ecology, 13(9):2667-2677.

Sorensen, P. C. 1993. Endangered and threatened wildlife and plants; finding on petition to list the California red-legged frog. Federal Register, 58(136):38553. [Monday, July 19, 1993].

Sorensen, P., and L. J. Propp. 1992. Endangered and threatened wildlife and plants; 90-day finding and commencement of status reviews for a petition to list the western pond turtle and California red-legged frog. Federal Register, 57(193):4561-45762. [Monday, October 5, 1992].

Stebbins, R. C. 2003. A field guide to western reptiles and amphibians. Third edition. Houghton Mifflin Company, Boston, Massachusetts. xiii+533 p.

Storer, T. I. 1923. Coastal range of yellow-legged frog in California. Copeia (114):8.

Storer, T. I. 1925. A synopsis of the Amphibia of California. University of California Publications in Zoology, 27:1-342.

U.S. Fish and Wildlife Service. 2005. Revised guidance on site assessments and field surveys for the California red-legged frog [dated August, 2005]. 26 p. (typewritten).

U.S. Fish and Wildlife Service 2006. Endangered and threatened wildlife and plants; designation of critical habitat for the California red-legged frog, and special rule exemption associated with final listing for existing routine ranching activities. Federal Register, 71(71):19244-19346. [Thursday, April 13, 2006].

Van Wagner, T. J. 1996. Selected life-history and ecological aspects of a population of foothill yellow-legged frogs (*Rana boylii*) from Clear Creek, Nevada County, California. Unpublished M.S. Thesis, California State University, Chico, California. xx+143 p.

Wright, A. H., and A. A. Wright. 1949. Handbook of frogs and toads of the United States and Canada. Third edition. Comstock Publishing Company, Ithaca, New York. xii+640 p.

Zweifel, R. G. 1955. Ecology, distribution, and systematics of frogs of the *Rana boylii* group. University of California Publications in Zoology, 54(4):207-292.

**APPENDICIES**

Appendix 1. California red-legged frog field survey forms for the Upper Berryessa Creek Project.

**Appendix E.**
**California Red-legged Frog Survey Data Sheet**

Survey results reviewed by _____ (FWS Field Office) _____ (date) _____ (biologist)

**Date of Survey:** 03/16/2006 (mm/dd/yyyy) **Survey Biologist:** Jennings, (Last name) Mark (first name)

**Survey Biologist:** _____ (Last name) _____ (first name)

**Site Location:** Santa Clara Co., Upper Berryessa Creek from Morrill Ave, upstream to 750 feet elevation.
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S ).

**ATTACH A MAP (include habitat types, important features, and species locations)**

Proposed project name: Upper Berryessa Creek Project
Brief description of proposed action:

**Type of Survey** (circle one): (DAY) NIGHT (BREEDING) NON-BREEDING

**Survey number** (circle one): (1) 2 3 4 5 6 7 8

**Begin Time:** 1:00 PM **End Time:** 6:00 PM

**Cloud cover:** Overcast **Precipitation:** Intermittent Light Rain

**Air Temperature:** 58°F **Water Temperature:** 50°F

**Wind Speed:** Low **Visibility Conditions:** Good

**Moon phase:** N/A **Humidity:** Heavy

**Description of weather conditions:** Light rain through much of the day off and on

**Brand name and model of light used to conduct surveys:** N/A

**Were binoculars used for the surveys** (circle one)? (YES) NO
**Brand, model, and power of binoculars:** Bushnell, Custom Compact, 7X26 CF

**Appendix E.**
**California Red-legged Frog Survey Data Sheet**

03/16/2006

**AMPHIBIAN OBSERVATIONS**

| Species | # of indiv. | Observed (O) Heard (H) | Life Stages | Size Class | Certainty of Identification |
|---|---|---|---|---|---|
| Pacific Treefrog | Dozens | O/H | Juveniles & Adults | All | 100% |
| California Toad | 2 | O | Juvenile | Post-Larval (last year's) | 100% |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: Many raccoon tracks noted along the stream. No other predators observed.

Other notes, observations, comments, *etc.*

**Necessary Attachments:**

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

**Appendix E.**
**California Red-legged Frog Survey Data Sheet**

Survey results reviewed by _____ _____ _____
(FWS Field Office) (date) (biologist)

**Date of Survey:** 03/24/2006 (mm/dd/yyyy) **Survey Biologist:** Jennings, Mark (Last name) (first name)

**Survey Biologist:** _____ (Last name) (first name)

**Site Location:** Santa Clara Co., Upper Berryessa Creek from Morrill Ave, upstream to 750 feet elevation,
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S ).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Upper Berryessa Creek Project
Brief description of proposed action:

**Type of Survey** (circle one): **DAY** (**NIGHT**) (**BREEDING**) **NON-BREEDING**

**Survey number** (circle one): 1 (2) 3 4 5 6 7 8

**Begin Time:** 6:30 PM **End Time:** 11:30 PM

**Cloud cover:** Overcast **Precipitation:** Moderate Rainfall

**Air Temperature:** 48°F **Water Temperature:** 50°F

**Wind Speed:** Low **Visibility Conditions:** Impaired by rain

**Moon phase:** Can't Tell (Clouds) **Humidity:** Heavy

**Description of weather conditions:** Moderate Rainfall -- perfect for hunting amphibians. Heard only Pacific treefrogs calling

**Brand name and model of light used to conduct surveys:** Koehler Wheat Lamp, 5000 Series, 4 Volts

**Were binoculars used for the surveys** (circle one)? (**YES**) **NO**
**Brand, model, and power of binoculars:** Bushnell, Custom Compact, 7X26 CF

**Appendix E.**
**California Red-legged Frog Survey Data Sheet**

03/24/2006

**AMPHIBIAN OBSERVATIONS**

| Species | # of indiv. | Observed (O) Heard (H) | Life Stages | Size Class | Certainty of Identification |
|---|---|---|---|---|---|
| Pacific Treefrog | 100's | O/H | All post-metamorphic | Juveniles-Adults | 100% |
| California Toad | 5 | O | Juveniles | Juveniles | 100% |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: No fish, bullfrogs, or crayfish seen. Many raccoon tracks observed. One dead raccoon seen above the Old Piedmont Road crossing.

Other notes, observations, comments, *etc.*

**Necessary Attachments:**

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

**Appendix E.**
**California Red-legged Frog Survey Data Sheet**

Survey results reviewed by _____ _____ _____
(FWS Field Office) (date) (biologist)

**Date of Survey:** 03/31/2006 (mm/dd/yyyy) **Survey Biologist:** Jennings, Mark (Last name) (first name)

**Survey Biologist:** _____ (Last name) (first name)

**Site Location:** Santa Clara Co., Upper Berryessa Creek from Morrill Ave, upstream to 750 feet elevation.
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S ).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Upper Berryessa Creek Project
Brief description of proposed action:

**Type of Survey** (circle one): DAY (NIGHT) (BREEDING) NON-BREEDING

**Survey number** (circle one): 1 2 (3) 4 5 6 7 8

**Begin Time:** 7:00 PM **End Time:** 10:30 PM

**Cloud cover:** Overcast **Precipitation:** Heavy Rain

**Air Temperature:** 44°F **Water Temperature:** 48°F

**Wind Speed:** Moderate **Visibility Conditions:** Poor (heavy rain)

**Moon phase:** Can't Tell (Cloudy) **Humidity:** Heavy

**Description of weather conditions:** Heavy rainfall much of the evening, Creek running in flood stage

**Brand name and model of light used to conduct surveys:** Koehler Wheat-Lamp, 5000 Series, 4 Volts

**Were binoculars used for the surveys** (circle one)? (YES) NO
**Brand, model, and power of binoculars:** Bushnell, Custom Compact, 7 X 26 CF

**Appendix E.**
**California Red-legged Frog Survey Data Sheet**

03/31/2006

**AMPHIBIAN OBSERVATIONS**

| Species | # of indiv. | Observed (O) Heard (H) | Life Stages | Size Class | Certainty of Identification |
|---|---|---|---|---|---|
| Pacific Treefrog | 6 | H | Adult Males | Adults | 100% |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: Raccoon tracks and 4 raccoons seen,

Other notes, observations, comments, *etc.*

Raining very hard; creek in flood stage,

**Necessary Attachments:**

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

**Appendix E.**
**California Red-legged Frog Survey Data Sheet**

Survey results reviewed by _____ (FWS Field Office) _____ (date) _____ (biologist)

**Date of Survey:** 04/10/2006 (mm/dd/yyyy) **Survey Biologist:** Jennings, Mark (Last name) (first name)

**Survey Biologist:** _____ (Last name) (first name)

**Site Location:** Santa Clara Co, Upper Berryessa Creek from Morrill Ave., upstream to 750 feet elevation.
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S ).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Upper Berryessa Creek Project
Brief description of proposed action:

**Type of Survey** (circle one): **DAY** (**NIGHT**) (**BREEDING**) **NON-BREEDING**

**Survey number** (circle one): 1 2 3 (4) 5 6 7 8

**Begin Time:** 8:45 PM **End Time:** 11:30 PM

**Cloud cover:** Partly Cloudy **Precipitation:** None

**Air Temperature:** 49°F **Water Temperature:** 48°F

**Wind Speed:** Light **Visibility Conditions:** Excellent

**Moon phase:** First Quarter **Humidity:** Moderate

**Description of weather conditions:** Clear and cool. Creek still cloudy from recent rains

**Brand name and model of light used to conduct surveys:** Kochler Wheat Lamp, 5000 Series, 4 Volts

**Were binoculars used for the surveys** (circle one)? (**YES**) **NO**
**Brand, model, and power of binoculars:** Bushnell, Custom Compact, 7 X 26 CF

**Appendix E.**
**California Red-legged Frog Survey Data Sheet**

04/10/2006

**AMPHIBIAN OBSERVATIONS**

| Species | # of indiv. | Observed (O) Heard (H) | Life Stages | Size Class | Certainty of Identification |
|---|---|---|---|---|---|
| No Amphibians Seen | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: Raccoon Tracks observed, No fish, crayfish, or bullfrogs seen.

Other notes, observations, comments, *etc.* Lots of trash in the lower reaches of the creek. Stream is still elevated and cloudy from recent rains.

**Necessary Attachments:**

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

**Appendix E.**
**California Red-legged Frog Survey Data Sheet**

Survey results reviewed by _____ _____ _____
(FWS Field Office) (date) (biologist)

**Date of Survey:** 04/30/2006 (mm/dd/yyyy) **Survey Biologist:** Jennings, Mark (Last name) (first name)

**Survey Biologist:** _____ (Last name) (first name)

**Site Location:** Santa Clara Co., Upper Berryessa Creek from Morrill Ave., upstream to 750 feet elevation,
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S ).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Upper Berryessa Creek Project
Brief description of proposed action:

**Type of Survey** (circle one): **DAY** (**NIGHT**) (**BREEDING**) **NON-BREEDING**

**Survey number** (circle one): 1 2 3 4 (5) 6 7 8

**Begin Time:** 6:30 PM **End Time:** 10:45 PM

**Cloud cover:** Partly Cloudy **Precipitation:** None

**Air Temperature:** 48°F **Water Temperature:** 51°F

**Wind Speed:** Light **Visibility Conditions:** Excellent

**Moon phase:** Half **Humidity:** Moderate

**Description of weather conditions:** Fairly clear and cool, Stream still cloudy from rains last week.

**Brand name and model of light used to conduct surveys:** Koehler Wheat Lamp, 5000 series, 4 volts

**Were binoculars used for the surveys** (circle one)? (**YES**) **NO**
**Brand, model, and power of binoculars:** Bushnell Custom Compact, 7X 26 CF

**Appendix E.**
**California Red-legged Frog Survey Data Sheet**

04/30/2006

**AMPHIBIAN OBSERVATIONS**

| Species | # of indiv. | Observed (O) Heard (H) | Life Stages | Size Class | Certainty of Identification |
|---|---|---|---|---|---|
| Pacific Treefrogs | Dozens | O/H | All | Larvae – Adults | 100% |
| California Toads | Dozens | O | Larvae and Juveniles | Larvae – Juveniles | 100% |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: Lots of raccoon tracks, No fish seen.

Other notes, observations, comments, *etc.* Stream still murky from recent rains.

**Necessary Attachments:**

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

**Appendix E.**
**California Red-legged Frog Survey Data Sheet**

Survey results reviewed by _____ _____ _____
(FWS Field Office) (date) (biologist)

**Date of Survey:** 05/17/2006 (mm/dd/yyyy) **Survey Biologist:** Jennings, Mark (Last name) (first name)
**Survey Biologist:** Moore, Melissa (Last name) (first name)

**Site Location:** Santa Clara Co, Upper Berryessa Creek from Morrill Ave, upstream to 750 feet elevation
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S ).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Upper Berryessa Creek Project
Brief description of proposed action:

**Type of Survey** (circle one): (DAY) NIGHT (BREEDING) NON-BREEDING

**Survey number** (circle one): 1 2 3 4 5 (6) 7 8

**Begin Time:** 10:00 AM **End Time:** 5:30 PM

**Cloud cover:** Partly Cloudy **Precipitation:** None

**Air Temperature:** 95°F **Water Temperature:** 65°F

**Wind Speed:** Light **Visibility Conditions:** Excellent

**Moon phase:** N/A **Humidity:** Moderate

**Description of weather conditions:** Fairly clear with a light breeze from time to time, Otherwise very hot!

**Brand name and model of light used to conduct surveys:** N/A

**Were binoculars used for the surveys** (circle one)? (YES) NO
**Brand, model, and power of binoculars:** Bushnell Custom Compact, 7X26 CF

**Appendix E.**
**California Red-legged Frog Survey Data Sheet**

05/17/2006

**AMPHIBIAN OBSERVATIONS**

| Species | # of indiv. | Observed (O) Heard (H) | Life Stages | Size Class | Certainty of Identification |
|---|---|---|---|---|---|
| Pacific Treefrogs | Dozens | O/H | All | Larvae-Adults | 100% |
| California Toads | Dozens | O | All | Larvae-Adults | 100% |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: No fish, bullfrogs, or crayfish seen, Raccoon tracks observed.

Other notes, observations, comments, *etc.*

California red-legged frogs (5 adults and 1 subadult) observed in stock pond overlooking the creek. CNDDB Form filled out and Water District Officials notified.

**Necessary Attachments:**

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

**Appendix E.**
**California Red-legged Frog Survey Data Sheet**

Survey results reviewed by _____ _____ _____
(FWS Field Office) (date) (biologist)

**Date of Survey:** 07/20/2006 (mm/dd/yyyy) **Survey Biologist:** Jennings, Mark (Last name) (first name)

**Survey Biologist:** _____ (Last name) (first name)

**Site Location:** Santa Clara Co, Upper Berryessa Creek from Morrill Ave, upstream to 750 feet elevation
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S ).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Upper Berryessa Creek Project
Brief description of proposed action:

**Type of Survey** (circle one): **DAY** (**NIGHT**) **BREEDING** (**NON-BREEDING**)

**Survey number** (circle one): 1 2 3 4 5 6 (7) 8

**Begin Time:** 7:45 PM **End Time:** 11:45 PM

**Cloud cover:** Partly Overcast **Precipitation:** None

**Air Temperature:** 88°F **Water Temperature:** 60°F

**Wind Speed:** Light **Visibility Conditions:** Excellent

**Moon phase:** First Quarter **Humidity:** Heavy

**Description of weather conditions:** Clear, humid, and hot.

**Brand name and model of light used to conduct surveys:** Kochler Wheat Lamp, 5000 Series, 4 Volts

**Were binoculars used for the surveys** (circle one)? (**YES**) **NO**
**Brand, model, and power of binoculars:** Bushnell Custom Compact, 7X26CF

**Appendix E.**
**California Red-legged Frog Survey Data Sheet**

07/20/2006

**AMPHIBIAN OBSERVATIONS**

| Species | # of indiv. | Observed (O) Heard (H) | Life Stages | Size Class | Certainty of Identification |
|---|---|---|---|---|---|
| Pacific Treefrog | Dozens | O/H | All | Larvae-Adult | 100% |
| California Toad | Dozens | O | All | Larvae-Juveniles | 100% |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: No fish, bullfrogs, or crayfish observed. Many raccoon tracks present along the creek.

Other notes, observations, comments, *etc.*

Most treefrog and toad reproduction along the lower reaches of the creek (in urban areas) where overflow from daily lawn watering keeps the stream hydrated.

**Necessary Attachments:**

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

**Appendix E.**
**California Red-legged Frog Survey Data Sheet**

Survey results reviewed by _____ _____ _____
(FWS Field Office) (date) (biologist)

**Date of Survey:** 07/27/2006 (mm/dd/yyyy) **Survey Biologist:** Jennings (Last name) Mark (first name)
**Survey Biologist:** Moore (Last name) Melissa (first name)

**Site Location:** Santa Clara Co., Upper Berryessa Creek from Morrill Ave, upstream to 750 feet elevation
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S ).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Upper Berryessa Creek Project
Brief description of proposed action:

**Type of Survey** (circle one): (DAY) NIGHT BREEDING (NON-BREEDING)

**Survey number** (circle one): 1 2 3 4 5 6 7 (8)

**Begin Time:** 10:00 Am **End Time:** 6:20 pm

**Cloud cover:** Partly Cloudy **Precipitation:** None

**Air Temperature:** 98°F **Water Temperature:** 65°F

**Wind Speed:** Light **Visibility Conditions:** Excellent

**Moon phase:** N/A **Humidity:** Moderate

**Description of weather conditions:** Clear and hot!

**Brand name and model of light used to conduct surveys:** N/A

**Were binoculars used for the surveys** (circle one)? (YES) NO
**Brand, model, and power of binoculars:** Bushnell Custom Compact, 7X 26CF

**Appendix E.**
**California Red-legged Frog Survey Data Sheet**

07/27/2006

**AMPHIBIAN OBSERVATIONS**

| Species | # of indiv. | Observed (O) Heard (H) | Life Stages | Size Class | Certainty of Identification |
|---|---|---|---|---|---|
| Pacific Treefrog | Dozens | O | All | Larvae-Adults | 100% |
| California Toad | Dozens | O | Larvae and Juveniles | Larvae-Juveniles | 100% |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: No fish, crayfish, or bullfrogs observed. Raccoon tracks seen.

Other notes, observations, comments, *etc.*

Check set of stock ponds on hillside. Found 5 spring fed ponds, one of which was almost dry. California red-legged frogs and Pacific treefrogs found in the lower 3 ponds. They probably utilize all the stock ponds when water is present. Also observed an adult Santa Cruz gartersnake hunting for amphibians.

**Necessary Attachments:**

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

Appendix 2. California red-legged frog habitat assessment form for the Upper Berryessa Creek Project.

**Appendix D.**
**California Red-legged Frog Habitat Site Assessment Data Sheet**

Site Assessment reviewed by _____ _____ _____
(FWS Field Office) (date) (biologist)

**Date of Site Assessment:** 03/16/2006
(mm/dd/yyyy)

**Site Assessment Biologists:** Jennings, Mark _____
(Last name) (first name) (Last name) (first name)

_____ _____
(Last name) (first name) (Last name) (first name)

**Site Location:** Santa Clara Co., Upper Berryessa Creek from Morrill Ave. upstream to 750 feet elevation,
**(County, General location name, UTM Coordinates or Lat./Long. or T-R-S ).**

****ATTACH A MAP** (include habitat types, important features, and species locations)****

Proposed project name: Upper Berryessa Creek Project
Brief description of proposed action:
The U.S. Army Corps of Engineers proposes to recharacterize upper Berryessa Creek from Morrill Ave. upstream to about 500 feet above old Piedmont Road. Riparian habitat improvement in Berryessa Creek Park is also proposed.

1) Is this site within the current or historic range of the CRF (circle one)? (YES) NO

2) Are there known records of CRF within 1.6 km (1 mi) of the site (circle one)? YES (NO)
If yes, attach a list of all known CRF records with a map showing all locations.

## GENERAL AQUATIC HABITAT CHARACTERIZATION

*(if multiple ponds or streams are within the proposed action area, fill out one data sheet for each)*

**POND**:
Size: _____ Maximum depth: _____

Vegetation: emergent, overhanging, dominant species: _____
_____
_____

Substrate: _____
_____

**Perennial or Ephemeral** *(circle one)*. If ephemeral, date it goes dry: _____

**Appendix D.**
**California Red-legged Frog Habitat Site Assessment Data Sheet**

**STREAM**:

Bank full width: 20 feet
Depth at bank full: 4 feet
Stream gradient: ~5%

Are there pools (circle one)? (YES) NO

If yes,

Size of stream pools: Between 4-6 feet wide
Maximum depth of stream pools: 2 feet (but most pools are <1-foot deep)

Characterize non-pool habitat: run, riffle, glide, other: Most of the non-pool habitat is composed of riffles and pocket water. There is heavy gasketing of cobbles and gravel by fines.

Vegetation: emergent, overhanging, dominant species: Flows through an oak woodland channel with sycamores, some gray pine, willows, and lots of poison oak.

Substrate: High percentages of rocks and cobbles with a few sections of bedrock and boulders. Lots of clay and fines present

Bank description: Starts out in urbanized zone with narrow cut channel. Further upstream the banks are more vertical in a steep sided canyon.

**Perennial or Ephemeral** *(circle one)*. If ephemeral, date it goes dry: Normally by the end of June of each year.

Other aquatic habitat characteristics, species observations, drawings, or comments:

No fish, crayfish, or bullfrogs observed. Pacific treefrogs successfully breed throughout the drainage. Both Pacific treefrogs and California toads are commonly observed in the urbanized stream channel in Berryessa Creek Park. Main stream looks unsuitable for California red-legged frogs due to ephemeral nature, lack of deep pools, high amount of fines on the stream bottom, and the presence of raccoons (tracks seen).

**Necessary Attachments:**

1. All field notes and other supporting documents
2. Site photographs
3. Maps with important habitat features and species location

Appendix 3. Completed California Natural Diversity Data Base form.

**California Native Species Field Survey Form**

Mail to:
Natural Diversity Data Base
California Dept. of Fish and Game
1416 Ninth Street, 12th Floor
Sacramento, CA 95814

For office use only
Source Code _____ Quad Code _____
Elm Code _____ Occ # _____
Copy to _____ Map Index # _____

**Date of field work:** 05 17 2006 (mo day year)

Scientific Name (no codes): Rana draytonii

Species Found? [X] yes [ ] no If not, why?
Total # Individuals: 6 Subsequent visit? [ ] yes [X] no
Compared to your last visit: [ ] more [ ] same [ ] fewer
Is this an existing NDDB occurrence? [ ] Yes, Occ. # [X] no [ ] unk.
Collection? If yes _____ number _____ Museum/Herbarium

**Reporter:** Mark R. Jennings
Address: Rana Resources, P.O. Box 2185, Davis CA 95617-2185
Phone: (530) 753-2727
Other knowledgeable individuals (name/address/phone):
Melissa Moore, Santa Clara Valley Water District

**Plant Information:**
Phenology: _____ %vegetative _____ % flowering _____ %fruiting

**Animal Information:**
Age Structure: 5 # adults 1 # juveniles 0 # unknown
Site Function: [X] breeding [X] foraging [X] wintering [ ] roosting [ ] burrow site [ ] other

**Location:** (Please also attach or draw map on back.) Stockpond in the Upper Berryessa Creek drainage, just west of the City of San Jose City Boundary.

County: Santa Clara Landowner/Mgr.: Private

Quad Name: Calaveras Reservoir, CA (1980) Elevation: 720 feet UTM: 10S 602668mE 4142113mN

"Lands of San Jose Mexican Land Grant"

T 6S R 1E ____ 1/4 of _____ 1/4 Sec _____ T _____ R _____ ____ 1/4 of _____ 1/4 Sec _____

**Habitat Description:** (Plant communities, dominants, associates, substrate/soils, aspect/slope)
Frogs found in a series of stock ponds created below a major spring. The lowest pond was examined and found to contain California red-legged frogs, Pacific treefrogs, and Santa Cruz gartersnakes. Pond was surrounded by grasses and sedges.
Other rare spp.?

**Site Information:** Current/surrounding land use: Livestock grazing

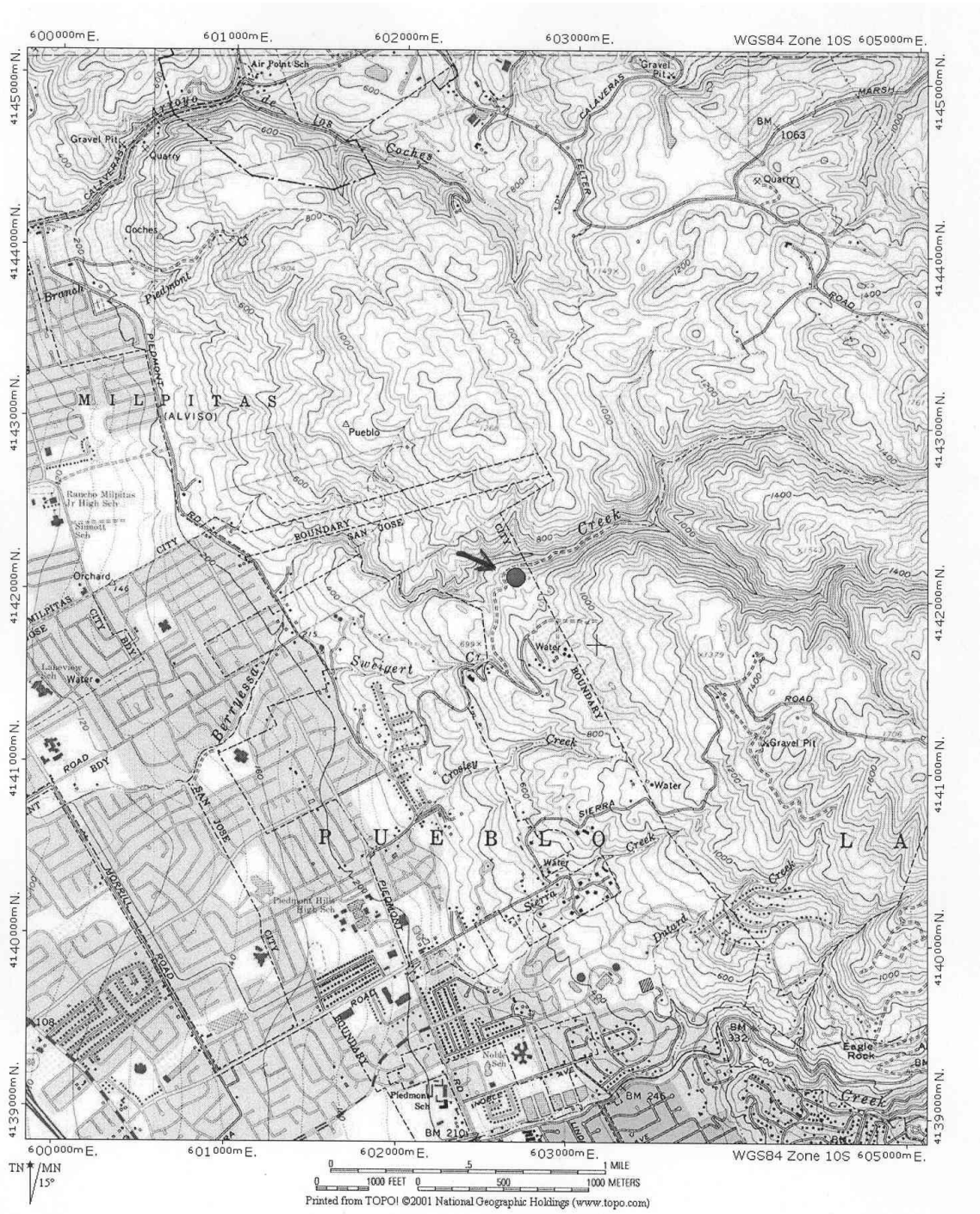
Visible disturbances, possible threats: None

Overall site quality: [ ] Excellent [X] Good [ ] Fair [ ] Poor Comments:

**Determination:** (Check one or more, fill in the blanks)
____ Keyed in a site reference: _____
____ Compared with specimen housed at: _____
____ Compared with photo/drawing in: _____
____ By another person (name): _____
__X__ Other: Personal knowledge

| **Photographs:** (Check one or more) | Slide | Print |
|---|---|---|
| Plant/animal | ____ | ____ |
| Habitat | ____ | ____ |
| Diagnostic Feature | ____ | ____ |
| Other | ____ | ____ |

May we obtain duplicates at our expense? [ ]yes [ ]no


600000mE.
601000mE.
602000mE.
603000mE.
WGS84 Zone 10S
605000mE.
4145000mN.
4144000mN.
4143000mN.
4142000mN.
4141000mN.
4140000mN.
4139000mN.
Air Point Sch
Gravel Pit
Quarry
Arroyo de los Coches
Coches Cr
CALAVERAS
FEETER
MARSH
BM 1063
Quarry
Gravel Pit
Coches
Branch
Piedmont
ROAD
PIEDMONT
M I L P I T A S
(ALVISO)
Pueblo
Rancho Milpitas Jr High Sch
Simmett Sch
BDY
SAN JOSE
CITY
Creek
Orchard
MILPITAS
Water
Lanevine Sch
Swigert
Cr
BOUNDARY
Berryessa
Creek
Crosley
Gravel Pit
Water
SIERRA
P U E B L O
L A
Creek
Water
Sierra
Creek
Piedmont Hills High Sch
Dutard
MORRILL
ROAD
BOUNDARY
Piedmont Sch
INDUSTRIAL
BM 332
Eagle Rock
Creek
BM 246
BM 210
600000mE.
601000mE.
602000mE.
603000mE.
WGS84 Zone 10S
605000mE.
TN
MN
15°
0 5 1 MILE
0 1000 FEET 0 500 1000 METERS
Printed from TOPO! ©2001 National Geographic Holdings (www.topo.com)